

## CLAIMS

What is claimed is:

1 1. A method of managing a network entity that is initiated by the network entity, the  
2 method comprising the computer-implemented steps performed at the network entity of:  
3 monitoring the network entity;  
4 periodically evaluating one or more specified conditions at the managed network  
5 entity;  
6 when one or more of the specified conditions are satisfied, then gathering specified  
7 information from the managed network entity, preparing a message that  
8 includes the specified information and the specified conditions that were  
9 satisfied, and sending the message to a management point.

1 2. A method of managing a network entity that is initiated by the network entity, the  
2 method comprising the computer-implemented steps of:  
3 receiving a request from a management application for interaction with the managed  
4 network entity;  
5 creating a management request that includes a network element identifier;  
6 storing a management request in a management proxy while awaiting a poll for the  
7 management request from the managed network entity;  
8 receiving a periodic poll message from the managed network entity, wherein the poll  
9 message requests any available management requests applicable to the  
10 managed network entity;  
11 selecting one or more management requests that match the managed network entity;  
12 and  
13 delivering the selected one or more management requests to the managed network  
14 entity.

1 3. A method as recited in Claim 2, further comprising the steps of:  
2 receiving a responsive management message from the managed network entity;

3       storing the responsive management message in the management proxy;  
4       receiving a second poll message from the management application, wherein the  
5            second poll message requests any responsive management messages  
6            applicable to the management application;  
7       selecting one or more responsive management messages that match the management  
8            application; and  
9       delivering the selected one or more responsive management messages to the  
10          management application.

1    4.    A method as recited in any of Claims 1 or 2, wherein the network entity is within a  
2    private network that is managed by a network service provider, and wherein the management  
3    point is within a public network that is owned or operated by the network service provider.

1    5.    A method as recited in any of Claims 1 or 2, wherein the network entity is a service  
2    appliance.

1    6.    A method as recited in any of Claims 1 or 2, wherein the network entity is a switch or  
2    router.

1    7.    A system for managing a network entity, comprising:  
2       one or more management applications hosted in a service provider network;  
3       a management communication program that is and communicatively coupled to the  
4            management applications, and comprising one or more sequences of  
5            instructions which, when executed by the network entity, causes the network  
6            entity to perform the steps of:  
7       monitoring the network entity;  
8       periodically evaluating one or more specified conditions at the network entity;  
9       when one or more of the specified conditions are satisfied, then gathering specified  
10          information from the network entity, preparing a message that includes the  
11          specified information and the specified conditions that were satisfied, and  
12          sending the message to the management applications.

1 8. A system as recited in Claim 7, further comprising a management communication  
2 transport element hosted in the private network, and wherein the step of sending the message  
3 to the management applications comprises the step of sending the message to the  
4 management applications using the management communication transport element.

1 9. A system as recited in Claim 8, wherein the management communication transport  
2 element is hosted at the network entity.

1 10. A system as recited in Claim 8, wherein the management communication transport  
2 element is hosted at a proxy server in the private network and accessible to the network  
3 entity.

1 11. A system for managing a network entity comprising:  
2 a management proxy hosted in a service provider network;  
3 a management communication transport hosted at the network element and  
4 communicatively coupled to the management proxy, and comprising one or  
5 more sequences of instructions which, when executed by the network entity,  
6 causes the network entity to perform the steps of:  
7 receiving a request from a management application for interaction with the managed  
8 network entity;  
9 creating a management request that includes a network element identifier;  
10 storing a management request in the management proxy while awaiting a poll for the  
11 management request from the managed network entity;  
12 receiving a periodic poll message from the managed network entity, wherein the poll  
13 message requests any available management requests applicable to the  
14 managed network entity;  
15 selecting one or more management requests that match the managed network entity;  
16 and  
17 delivering the selected one or more management requests to the managed network  
18 entity.

1       12.    A system as recited in Claim 11, wherein the instructions further comprise sequences  
2       of instructions for performing the steps of:

3            receiving a responsive management message from the managed network entity;  
4            storing the responsive management message in the management proxy;  
5            receiving a second poll message from the management application, wherein the  
6               second poll message requests any responsive management messages  
7               applicable to the management application;  
8            selecting one or more responsive management messages that match the management  
9               application; and  
10          delivering the selected one or more responsive management messages to the  
11            management application.

1       13.    A system as recited in Claim 11, wherein the management proxy is hosted at the  
2       network entity.

1       14.    A system as recited in Claim 11, wherein the management proxy is hosted at a proxy  
2       server in the private network and accessible to the network entity.

1       15.    A system as recited in any of Claims 7 or 11, wherein the network entity is within a  
2       private network that is managed by a network service provider, and wherein the management  
3       point is within a public network that is owned or operated by the network service provider.

1       16.    A system as recited in any of Claims 7 or 11, wherein the network entity is a service  
2       appliance.

1       17.    A system as recited in any of Claims 7 or 11, wherein the network entity is a switch  
2       or router.

1       18.    A computer-readable medium carrying one or more sequences of instructions for  
2   managing a network entity through initiation by the network entity, which instructions, when  
3   executed by one or more processors, cause the one or more processors to carry out the steps  
4   of any of Claims 1, 2, or 3.

1       19.    A computer-readable medium as recited in Claim 18, wherein the network entity is  
2   within a private network that is managed by a network service provider, and wherein the  
3   management point is within a public network that is owned or operated by the network  
4   service provider.

1       20.    A computer-readable medium as recited in Claim 18, wherein the network entity is a  
2   service appliance.

1       21.    A computer-readable medium as recited in Claim 18, wherein the network entity is a  
2   switch or router.

1       22.    An apparatus for managing a network entity that is initiated by the network entity,  
2   comprising:  
3           means for monitoring the network entity;  
4           means for periodically evaluating one or more specified conditions at the managed  
5           network entity;  
6           means for gathering, when one or more of the specified conditions are satisfied,  
7           specified information from the managed network entity, for preparing a  
8           message that includes the specified information and the specified conditions  
9           that were satisfied, and for sending the message to a management point.

1       23. An apparatus for managing a network entity that is initiated by the network entity,  
2 comprising:  
3           means for receiving a request from a management application for interaction with the  
4           managed network entity;  
5           means for creating a management request that includes a network element identifier;  
6           means for storing a management request in a management proxy while awaiting a  
7           poll for the management request from the managed network entity;  
8           means for receiving a periodic poll message from the managed network entity,  
9           wherein the poll message requests any available management requests  
10           applicable to the managed network entity;  
11           means for selecting one or more management requests that match the managed  
12           network entity; and  
13           means for delivering the selected one or more management requests to the managed  
14           network entity.

1       24. An apparatus as recited in Claim 23, further comprising:  
2           means for receiving a responsive management message from the managed network  
3           entity;  
4           means for storing the responsive management message in the management proxy;  
5           means for receiving a second poll message from the management application,  
6           wherein the second poll message requests any responsive management  
7           messages applicable to the management application;  
8           means for selecting one or more responsive management messages that match the  
9           management application; and  
10           means for delivering the selected one or more responsive management messages to  
11           the management application.

1    25. An apparatus as recited in any of Claims 22 or 23, wherein the network entity is  
2    within a private network that is managed by a network service provider, and wherein the  
3    management point is within a public network that is owned or operated by the network  
4    service provider.

1    26. An apparatus as recited in any of Claims 22 or 23, wherein the network entity is a  
2    service appliance.

1    27. An apparatus as recited in any of Claims 22 or 23, wherein the network entity is a  
2    switch or router.

1    28. A method for a network element to initiate notification to a management point about  
2    an anomalous condition, comprising the computer-implemented steps of:  
3        receiving first definitions of one or more triggers, each comprising one or more  
4            conditions;  
5        receiving second definitions of report information;  
6        determining that any of the triggers is satisfied, and in response thereto, initiating at  
7            the network element communication of at least some of the report  
8            information.

1    29. A method as recited in Claim 28, wherein each of the conditions comprises an event,  
2    alarm, combination of events or alarms, or pattern of events or alarms.

1    30. A method as recited in Claim 28, wherein each of the conditions comprises a state of  
2    the network element.

1    31. A method as recited in Claim 28, wherein the report information describes any of the  
2    triggers that were determined as satisfied.

1       32.     A method as recited in Claim 28, wherein the report information comprises any of a  
2     core dump from the network element, a configuration of the network element, state  
3     information for the network element, or a log of the network element.

1       33.     A method as recited in Claim 28, wherein the steps are performed by a server that is  
2     logically separate from the network element, wherein the server manages notifications for a  
3     plurality of network elements.

1       34.     A method for a network element to initiate notification to a management point about  
2     an anomalous condition, comprising the computer-implemented steps of:  
3             requesting a management gateway that is communicatively coupled to the network  
4                 element to provide one or more application requests for the network element  
5                 that have been stored at the management gateway by an application;  
6             in response to receiving an application request, initiating at the network element a  
7                 communication session between the network element and the management  
8                 application for enabling the network element to reply to the application  
9                 request.

1       35.     A method as recited in Claim 34, wherein the steps are performed by a server that is  
2     logically separate from the network element and communicatively coupled to the  
3     management gateway.

1       36.     A method as recited in Claim 34, further comprising the step of initiating at the  
2     network element communication of at least some of the report information that is responsive  
3     to the application request.

1    37.    A method as recited in Claim 34, wherein each of the application requests comprises  
2    first definitions of one or more triggers, each comprising one or more conditions, and second  
3    definitions of report information; and further comprising the step of determining that any of  
4    the triggers is satisfied, and in response thereto, initiating at the network element  
5    communication of at least some of the report information.

1    38.    A method as recited in Claim 37, wherein each of the conditions comprises an event,  
2    alarm, combination of events or alarms, or pattern of events or alarms.

1    39.    A method as recited in Claim 37, wherein each of the conditions comprises a state of  
2    the network element.

1    40.    A method as recited in Claim 37, wherein the report information describes any of the  
2    triggers that were determined as satisfied.

1    41.    A method as recited in Claim 37, wherein the report information comprises any of a  
2    core dump from the network element, a configuration of the network element, state  
3    information for the network element, or a log of the network element.